

# CLAUDE.md

This file provides guidance to Claude Code (claude.ai/code) when working with code in this repository.

## Overview

This is a Quarto website for Math 557 (Mathematical Logic) course materials at Penn State, Fall 2025. The site contains lecture notes organized chronologically, covering topics from basic syntax and semantics through the Löwenheim-Skolem theorems.

## Project Structure

- **Source files:** .qmd files containing lecture notes (e.g., 001\_Aug27\_syntax.qmd, 014\_Oct03\_elementary\_substructures.qmd)
  - Naming convention: NNN\_MonDD\_topic.qmd where NNN is a sequence number
  - Each file is standalone and represents one lecture date
- **LaTeX files:** Some lecture notes exist as .tex files (e.g., mathlogik\_kapitel\_4.tex, 014\_Oct06\_loewenheim\_skolem.tex)
  - German-language reference material
- **Configuration:** \_quarto.yml contains website configuration and sidebar navigation
- **Output:** \_site/ directory (git-ignored) contains rendered HTML
- **Extensions:** Two Quarto extensions in \_extensions/:
  - `callouty-theorem`: Creates theorem-like callouts (exercises use `#exr-` with `callout-type: tip`)
  - `search-replace`: Defines shortcuts like `+L →  $\mathcal{L}$`

## Common Commands

### Build and preview the website

```
quarto preview
```

Starts a local server with live reload at <http://localhost:4200>

### Render the entire website

```
quarto render
```

Outputs to \_site/ directory

### Render a single document

```
quarto render 014_Oct03_elementary_substructures.qmd
```

### Render to PDF

```
quarto render <file>.qmd --to pdf
```

## Content Architecture

### QMD File Structure

Each .qmd lecture file follows this pattern: - YAML frontmatter with title (e.g., `title: "Math 557 Oct 3"`) - Main heading with topic (e.g., `# Elementary Substructures`) - Optional subsections (e.g., `## Key Concepts`, `## Problems`) - Exercises marked with `::: {#exr-}` callout blocks - Math notation using LaTeX syntax - Special callouts like `{.callout-important}` for take-home problems

## Sidebar Navigation

The sidebar is configured in `_quarto.yml` under `website.sidebar.contents`. When adding new lecture notes: 1. Create the `.qmd` file with appropriate naming (sequence number, date, topic) 2. Add an entry to the sidebar with `href` and `text` (typically the date) 3. Entries appear in order listed in the config file

## Custom Shortcuts

The `search-replace` extension provides text shortcuts: - `+L` expands to `$$\mathcal{L}$$` (the language symbol) - To add more shortcuts, edit the `search-replace` section in `_quarto.yml`

## Working with Content

### Adding a New Lecture

1. Create file: `NNN_MonDD_topic.qmd` (increment sequence number)
2. Add YAML frontmatter with title
3. Add to sidebar in `_quarto.yml`
4. Use standard formatting patterns (see existing files)

## LaTeX vs QMD

- Legacy `.tex` files exist (in German) for reference
- Active development uses `.qmd` format
- Some content may need to be converted from `.tex` to `.qmd` format
- When converting, preserve mathematical notation and structure but adapt to QMD callout syntax